

## ABSTRACT

An antenna array comprised of a fractile array having a plurality of antenna elements uniformly distributed along Peano-Gosper curve.

An antenna array comprised of an array having an irregular boundary contour.

- 5 The irregular boundary contour comprises a plane tiled by a plurality of fractiles and the plurality of fractiles covers the plane without any gaps or overlaps.

- A method for generating an antenna array having improved broadband performance. A plane is tiled with a plurality of non-uniform shaped unit cells of an antenna array. The non-uniform shape of the unit cells and the tiling of said unit cells are  
10 then optimized.

- A method for rapidly forming a radiation pattern of a fractile array and a Peano-Gosper fractile array. A pattern multiplication for fractile arrays is employed wherein a product formulation is derived for the radiation pattern of a fractile array for a desired stage of growth. The pattern multiplication for fractile arrays is recursively applied to  
15 construct higher order fractile arrays. An antenna array is then formed based on the results of the recursive procedure.